Professor David Groves
The Royal Society of Western Australia Medallist, 2005

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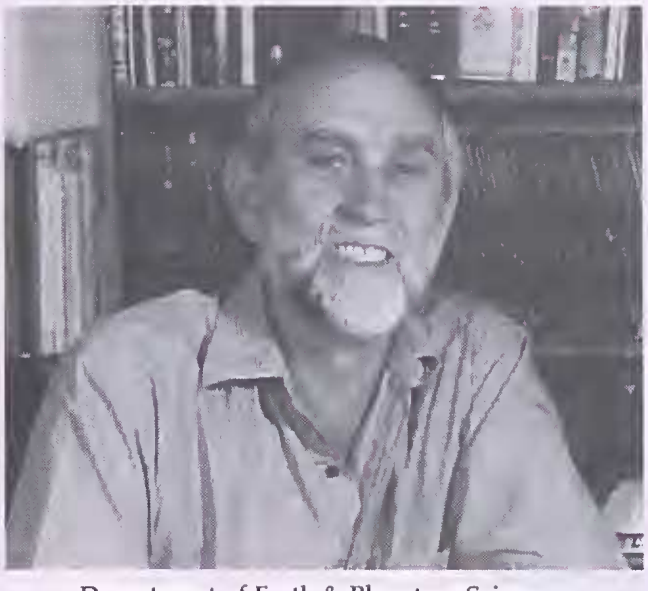

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Born in Brighton, England in 1942, David Groves was educated at Varndean Grammar School before emigrating to Tasmania and attending Hobart High School. He gained a First Class BSc Honours from the University of Tasmania in 1963 and a Ph.D. from that university in 1968. He spent the remainder of his time employed with the Geological Survey of Tasmania, mainly mapping on the west and northeast coasts of the island. Among many other technical papers, he published Bulletins on the famous Mount Bischoff tin field and on the Blue Tier Batholith of north eastern Tasmania.

David joined the University of Western Australia (UWA) in 1971 as a lecturer in economic geology. During his early years at UWA, he taught economic geology, ore genesis, structural geology and field mapping at all undergraduate levels. His research was mainly on evolution of the Archaean Yilgarn and Pilbara Blocks and the origin of komatiite-associated nickel deposits. David progressed from Lecturer to Senior Lecturer to Associate Professor, and by 1987 was a Professor and Director of the Key Centre for Strategic Mineral Deposits. By that time, his main research interests had evolved to the genesis of gold deposits and the use of GIS in conceptual exploration targeting. David remained as Director of the Centres for Strategic Mineral Deposits and its successor, the Centre for Global Metallogeny, until his early retirement in 2005 to facilitate the generation of a new centre, the Centre for Exploration Targeting, at UWA. In the last few years at UWA, his interests have focused on global metallogeny, the influence of lithosphere on the temporal and spatial distribution of mineral deposits, and conceptual exploration. In 2006, he became Emeritus Professor at UWA as well as a company director and industry consultant.

Throughout has academic career, David authored or co-authored over 500 published papers and supervised over 80 PhD, 35 MSc and 120 BSc Honours students. His major contribution has been to mentor young geologists who have gone on to very successful careers in industry or academia.

During his career, David has been both President of the Geological Society of Australia and its WA Division and President of the Society of Economic Geologists, and is now President Elect of SGA (the European Society of Economic Geologists). He has also served on a number of national and international committees. Honours received include the Stillwell Award of the Geological Society of Australia (GSA), the Clarke Medal of the Royal Society of New South Wales, the inaugural Gibb-Maitland Award of the W.A. Division of GSWA, the Silver Medal of the Society of Economic Geologists, the Geological Association of Canada Medal, the Jubilee Medal of the Geological Society of South Africa, the Goldfields Medal and the Kelvin Medal of the Royal Society of Western Australia. David became a Fellow of the Australian Academy of Science in 2005.

Controls on the Temporal Distribution of Ore Deposits: An Explanation for the Mineral Wealth of WA (Medal Address, November 2005)

Mineral deposits exhibit heterogeneous distributions, with each major deposit type showing distinctive, commonly unique, temporal patterns. These reflect a complex interplay between formational and preservational forces that, in turn, largely reflect changes in tectonic processes and environmental conditions in an evolving Earth. Sedimentary mineral deposits mined for redox sensitive metals show highly anomalous temporal patterns in which specific deposit types are restricted to particular times in Earth history. In particular, palaeoplacer uranium, banded iron formation (BIF) and BIF-associated manganese carbonates that formed in the early Precambrian do not reappear in younger basins. The most obvious driver is progressive oxidation of the atmosphere, with consequent long-term changes in the hydrosphere and biosphere, the latter influencing the temporal distribution and peak development of deposits such as Mississippi Valley types (MVT), hosted in biogenic sedimentary rocks.

In terms of tectonic processes, the major drivers were the supercontinent cycle and evolution from plume-dominated to modern-style plate tectonics in a cooling Earth. Consequent decrease in the growth rate of continental crust, and change from thick, buoyant sub-continental lithospheric mantle (SCLM) in the Precambrian to thinner, negatively buoyant SCLM in the Phanerozoic (Fig. 1), led to progressive decoupling of formational and preservational processes through time. This affected the temporal patterns of deposit types including orogenic gold, porphyry and epithermal deposits, volcanic hosted massive sulphide (VHMS), palaeoplacer Au, iron oxide, copper gold (IOCG), platinum group elements (PGE), diamond and probably massive sulphide SEDEX deposits.

As Western Australia is dominated by Archaean cratons and intervening Proterozoic belts, it is largely underlain by thick buoyant SCLM. This largely protected the gold and nickel deposits, in Archaean cratons from erosion, enhancing the mineral wealth of Western Australia. The great stability of the SCLM also aided in the generation of surficial bauxite and laterite nickel deposits during the prolonged tropical to arid weathering cycles that affected the State.

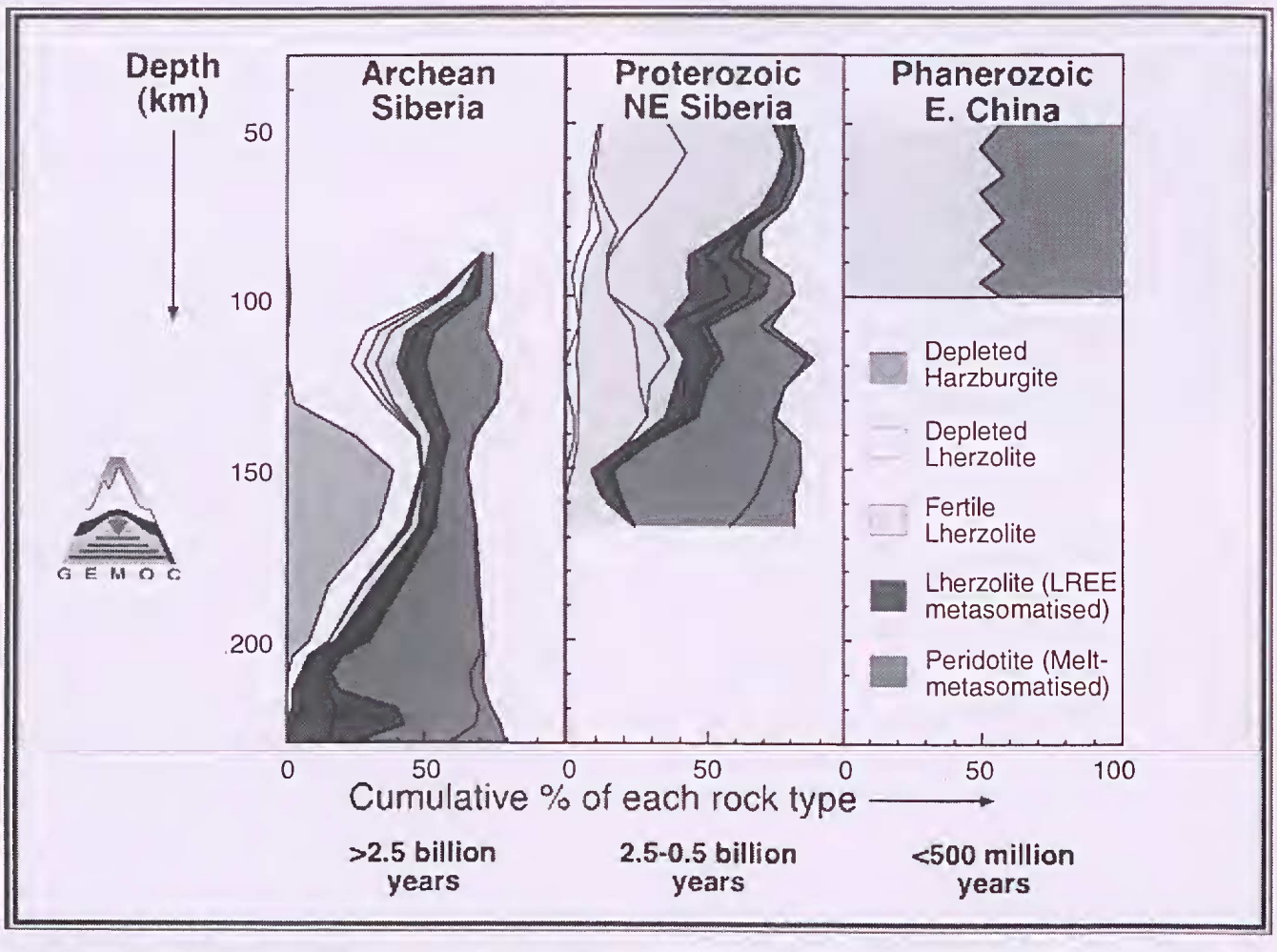

Figure 1. Depth and depth variation in composition of selected Archaean, Proterozoic and Phanerozoic lithospheric sections, showing changes in both depth and composition of sub-continental mantle lithosphere with time. Mean densities (at 20 °C) and relative buoyancy also shown. Modified from GEMOC.